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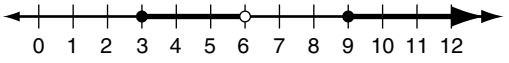
CHAPTER 12

Cumulative Test

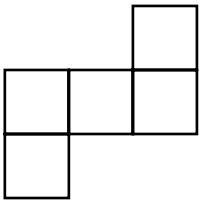
Select the best answer.

1. Which expression in interval notation represents the set of numbers graphed below?



A (3, 6] OR (9, ∞]
B [3, 6) OR [9, ∞)
C (3, 6] AND (9, ∞]
D [3, 6) AND [9, ∞)

2. A contractor is covering a bathroom floor with square tiles and makes a design using 5 square tiles. The area of the design is 20 in^2. What is the perimeter of the design?



F 8 in.
G 12 in.
H 24 in.
J 32 in.

3. If $f(x) = 2 - 2x^2$, what is $f(-2)$?

A -6
B 0
C 6
D 10

4. The point $(3, -4)$ is translated 4 units down and 5 units to the right. What are the coordinates of the translated point?

F $(-1, 1)$
G $(8, -8)$
H $(8, 0)$
J $(-2, -8)$

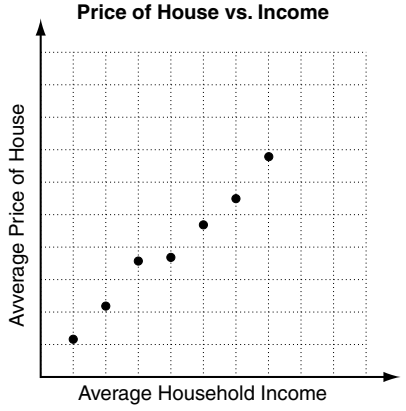
5. In a basketball game, three players score a combined 37 points. Antoine scores 5 more points than Mason, and Preston scores 2 more points than Mason. How many points does Mason score?

A 8
B 10
C 12
D 15

6. Tony is driving across the country from his college to his home. He starts off 3200 miles from home and drives 500 miles each day. Which function expresses his distance from home as a function of days d?

F $f(d) = 3200 - 500d$
G $f(d) = 3200d - 500$
H $f(d) = 3200d - 500d$
J $f(d) = 3200 - 500 - d$

7. An economist graphs the average price of houses versus average household income in a town over a number of years.



Which correlation coefficient makes sense for this relationship?

A -0.94
B -0.15
C 0.15
D 0.94

8. How many solutions does the system $\begin{cases} 3x = y + 2 \\ 2y = 6x - 2 \end{cases}$ have?

F 0
G 1
H 2
J 3

9. What is the solution of the system $\begin{cases} 2x + 2y + 2z = 4 \\ x + y - z = 4 \\ 2x - y + z = 5 \end{cases}$?

A $(1, 0, 1)$
B $(3, -2, 0)$
C $(3, 0, -1)$
D $(2, 0, 1)$

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CHAPTER 12

Cumulative Test

continued

10. A theater keeps track of the prices for different tickets in the matrix $P_{4\times2}$. They keep track of their sales over a weekend in a second matrix, $S_{2\times3}$. The manager multiplies the matrices to find the total income. What are the dimensions of the resulting matrix PS?

F 2×2 **H** 4×3

G 4×2 **J** 8×6

11. What is the determinant of the matrix $\begin{bmatrix} 3 & 1 & 0 \\ 0 & 5 & 3 \\ 0 & -5 & -2 \end{bmatrix}$?

A -75 **C** 15

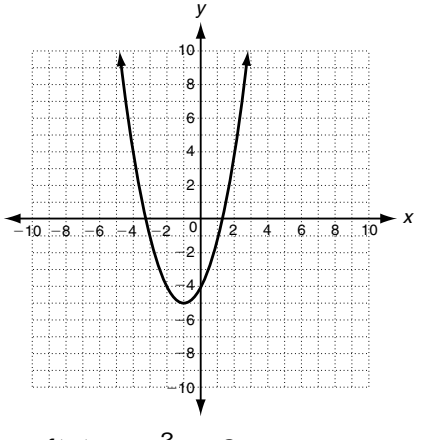
B -15 **D** 75

12. A drama club buys supplies for the set construction of their new play. Paint costs \$8 per can, brushes cost \$4 each, and safety glasses are \$6 each. They pay \$104 for 19 items. They buy 5 more safety glasses than cans of paint. How many safety glasses did they purchase?

F 3 **H** 6

G 5 **J** 8

13. Which function is represented by the graph below?



A $f(x) = x^2 - 2x$

B $f(x) = x^2 - 4x$

C $f(x) = x^2 + 2x - 4$

D $f(x) = x^2 - 2x + 4$

14. A pigeon lands on top of the Eiffel Tower and then, spotting a scrap of food, dives to the ground below. The pigeon's height in meters is approximately $h(t) = -5t^2 + 300$ where t is the time in seconds. About how long is the pigeon in the air?

F 7.7 s **H** 15.6 s

G 9.5 s **J** 17.3 s

15. Solve $x^2 - 6x + 1 = 0$ by completing the square.

A $2 \pm 2\sqrt{2}$ **C** $3 \pm \sqrt{2}$

B $3 \pm 2\sqrt{2}$ **D** $2 \pm \sqrt{2}$

16. What is the product of $(3 + i)(2 - 2i)$?

F $4 - 6i$ **H** $4 - 4i$

G $6 - 4i$ **J** $8 - 4i$

17. A farmer has kept careful track of his orange grove's output over the years. The number of oranges produced can be modeled by $N(t) = -t^2 + 100t + 200$. The average weight of the oranges over this same time can be modeled by $W(t) = -0.0001t^2 + 0.02t + 0.5$. Which polynomial below models the total weight of oranges produced by this grove?

A $0.0001t^4 - 0.02t^3 + 0.5t^2 + 4t + 50$

B $0.0001t^4 - 0.01t^3 + 1.98t^2 + 4t + 50$

C $0.0001t^4 - 0.03t^3 + 1.48t^2 + 54t + 100$

D $0.0001t^4 - 0.02t^3 + 1.50t^2 + 4t + 100$

18. Which is a factor of $x^3 - 3x^2 - 4x + 12$?

F $(x + 3)$ **H** $(x + 4)$

G $(x - 2)$ **J** $(x - 4)$

19. Which polynomial below has degree 4 and leading coefficient of 3?

A $2x^3 + 3x^4 - 2x$

B $3x^2 + 2x^4 - 4x$

C $4x^3 + 2x^2 - 3x$

D $3x^3 + 4x^4 - 2x$

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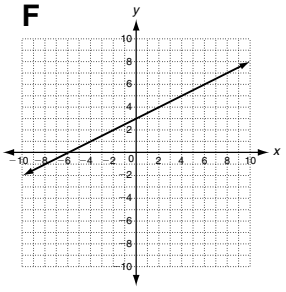
CHAPTER 12

Cumulative Test

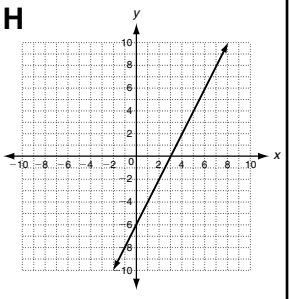
continued

20. Which graph below is the inverse of $f(x) = \frac{1}{2}x + 3$?

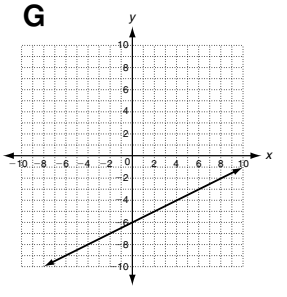
F



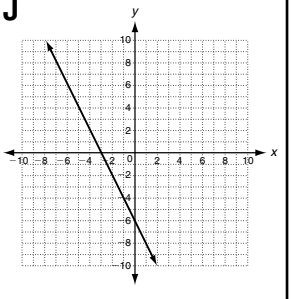
H



G



J



21. Warren invests $1000 in a stock that earns 6% annually. How many years will it take him to become a millionaire?

A 78 **C** 119

B 99 **D** 131

22. Simplify $e^{\ln(5x)}$.

F $5x$ **H** x^5

G $5x^e$ **J** x^{5e}

23. Zahra went jogging for 120 minutes. She averaged a speed of 4.5 mi/h. How long would the same jog take her if she ran at a speed of 5 mi/h?

A 60 min **C** 100 min

B 84 min **D** 108 min

24. What is the least common multiple of $x^2 + 2x - 15$ and $x^2 + 6x + 5$?

F $(x + 5)^2(x + 1)(x + 3)$

G $(x + 5)^2(x + 1)(x - 3)$

H $(x + 5)(x + 1)(x - 3)$

J $(x + 5)(x + 1)(x + 3)$

25. The volume of a cylinder with a height equal to its radius r can be found with the formula $V = \pi r^3$. A propane company designs a new cylindrical tank of this type that can hold 50 ft^3 of propane. What is the measurement of the radius and height in feet?

A 1.17 **C** 3.98

B 2.52 **D** 5.02

26. Solve $\sqrt{2x + 4} - 3 < 1$.

F $-2 \le x < 0$ **H** $-2 \le x < 8$

G $-2 \le x < 6$ **J** $-2 \le x < 12$

27. A bakery has priced their wedding cakes at $200 for the first 50 servings, and $5 per additional serving. Which piecewise function shows the price of a cake for x servings?

A $f(x) = \begin{cases} 200 & \text{if } 0 \le x \le 50 \\ 5(x - 50) & \text{if } x > 50 \end{cases}$

B $f(x) = \begin{cases} 200 & \text{if } 0 \le x \le 50 \\ 5x + 200 & \text{if } x > 50 \end{cases}$

C $f(x) = \begin{cases} 200 & \text{if } 0 \le x \le 50 \\ 5(x - 50) + 200 & \text{if } x > 50 \end{cases}$

D $f(x) = \begin{cases} 200(x - 50) & \text{if } 0 \le x \le 50 \\ 5(x - 50) + 200 & \text{if } x > 50 \end{cases}$

28. What is the inverse of the function $f(x) = \frac{8}{4 - 2x}$?

F $f^{-1}(x) = 4 - \frac{2}{x}$

G $f^{-1}(x) = 2 - 4x$

H $f^{-1}(x) = 2 - \frac{4}{x}$

J $f^{-1}(x) = 4 - 2x$

29. A number cube and a coin are tossed at the same time. What is the probability of rolling an even number on the number cube and tossing a tails on the coin?

A 0.25 **C** 0.50

B 0.33 **D** 0.67

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CHAPTER 12

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continued

30. What is the equation of a line that is tangent to the circle $(x - 2)^2 + y^2 = 25$ at the point $(6, 3)$?

F $y = -\frac{3}{4}x + 8$ **H** $y = \frac{4}{3}x - 5$

G $y = \frac{3}{4}x - 2$ **J** $y = -\frac{4}{3}x + 11$

31. On a geologists' map, an elliptical lake with center $(0, 0)$ has vertex $(0, 9)$ and co-vertex $(6, 0)$. What is the equation of the ellipse?

A $\frac{x^2}{81} - \frac{y^2}{36} = 1$ **C** $\frac{x^2}{36} - \frac{y^2}{81} = 1$

B $\frac{x^2}{36} + \frac{y^2}{81} = 1$ **D** $\frac{x^2}{81} + \frac{y^2}{36} = 1$

32. What conic section is described by the equation $x^2 + (y - 10)^2 = 21^2$?

F circle **H** ellipse

G parabola **J** hyperbola

33. Billy has 3 extra tickets to a football game, but he has 12 friends who would like to go to the game. How many ways can he choose 3 of his friends to go to the game with him?

A 220 **C** 1320

B 360 **D** 1728

34. Ms. Passo keeps track of how many of her students earn A's in her classes each year. For the last 8 years, the number of students has been 11, 18, 16, 16, 17, 10, 13, and 15. What are the mean and the median of this data?

F mean = 16; median = 14.5

G mean = 14.5; median = 16

H mean = 14.5; median = 15.5

J mean = 15.5; median = 14.5

35. What are the first 4 terms of the sequence $a_n = 100 - 3^n$?

A 97, 94, 91, 88 **C** 100, 97, 91, 82

B 97, 91, 73, 19 **D** 100, 97, 91, 73

36. An oil company is drilling a deep hole. The last foot of rock they drilled took 30 minutes, but each additional foot will take 5 minutes longer than the one before it. How many minutes will it take them to drill 10 more feet?

F 510 **H** 555

G 525 **J** 575

37. What is the 38th term of the arithmetic sequence 19, 26, 33, 40, …?

A 271 **C** 285

B 278 **D** 292

38. To buy tickets for a concert, customers have to pay a flat handling charge and then a certain cost per ticket. 11 tickets cost a total of \$260 and 20 tickets cost a total of \$458. What is the handling charge?

F \$16 **H** \$20

G \$18 **J** \$22

39. A small museum opens and draws crowds totaling 2000 the first year. If the museum increases its annual number of tourists by 3% each year, approximately how many people total will visit the museum during the first 5 years?

A 2251 **C** 10,300

B 2319 **D** 10,619

40. What is the sum of the infinite series $\sum_{k=1}^{\infty} -2\left(\frac{2}{3}\right)^k$?

F -6 **H** 3

G -3 **J** 6

41. What is the geometric mean of 0.25 and 961?

A 6.75 **C** 62

B 15.5 **D** 240.25

9. 10

10. $20

11. 45.5

12. 0.5

13. 170.5

14. $8908.64

15. ± 30

16. 2

17. 153

18. 11.43

19. 21.875

20. diverges

21. 24

22. 7.5

23. any $n \geq 2$

24. 40

Chapter Test Form C

1. 0, 3.5, -7, 24.5, -70

2. $a_n = 150 - (3.5)(n - 1)$

3. 2326

4. a_4: 24 squares; a_5: 25 squares

5. $\sum_{k=1}^{3} 45\left(\frac{1}{9}\right)^{k-1}$

6. 4.9 inches

7. 501

8. 127 minutes

9. -434.18

10. 8:35

11. 462

12. 0.82

13. -7272

14. $28.81

15. $\pm 2\sqrt{95}$

16. $\frac{4}{5}$

17. 89 square feet

18. -1

19. 14.76 hours

20. diverges

21. 17 cm

22. $\frac{1}{2}$

23. $0 < n < 1$

24. 25

Performance Assessment

1. $400,000; $320,000; $256,000; $204,800

2. geometric sequence

3. $a_n = a_{n-1} \cdot (0.8)$ or $a_n = 400{,}000 \cdot (0.8)^{n-1}$

4. $1,180,800

5. geometric series

6. $S = \frac{a_1}{1 - r} = \frac{\$400{,}000}{1 - 0.8} = \$2{,}000{,}000$

7. $\frac{\$2{,}000{,}000}{\$400{,}000} = 5$

8. The economic multiplier is $\frac{1}{1 - r}$;

e.m. $= \frac{S}{a_1} = \frac{\frac{a_1}{1 - r}}{a_1} = \frac{\cancel{a_1}}{1 - r} \cdot \frac{1}{\cancel{a_1}} = \frac{1}{1 - r}$.

9. $\frac{1}{1 - 0.5} = 2$

10. $4 = \frac{1}{1 - r}$; $r = 0.75 = 75\%$

Cumulative Test

1. B

2. H

3. A

4. G

5. B

6. F

7. D

8. F
9. C
10. H
11. C
12. J
13. C
14. F
15. B
16. J
17. C
18. G
19. A
20. H
21. C
22. F
23. D
24. H
25. B
26. G
27. C
28. H
29. A
30. J
31. B
32. F
33. A
34. H
35. B
36. J
37. B
38. G
39. D
40. F
41. B

CHAPTER 13

Section Quiz: Lessons 13-1 to 13-4

1. A
2. J
3. B
4. H
5. A
6. F
7. B
8. F
9. D
10. H
11. B
12. H

Section Quiz: Lessons 13-5 to 13-6

1. A
2. J
3. B
4. G
5. D
6. G
7. A
8. H
9. D
10. H

Chapter Test Form A

1. A
2. B
3. A